Exhibit A: Station Examples

Examples of Similar Stations
Chinatown Station - San Francisco

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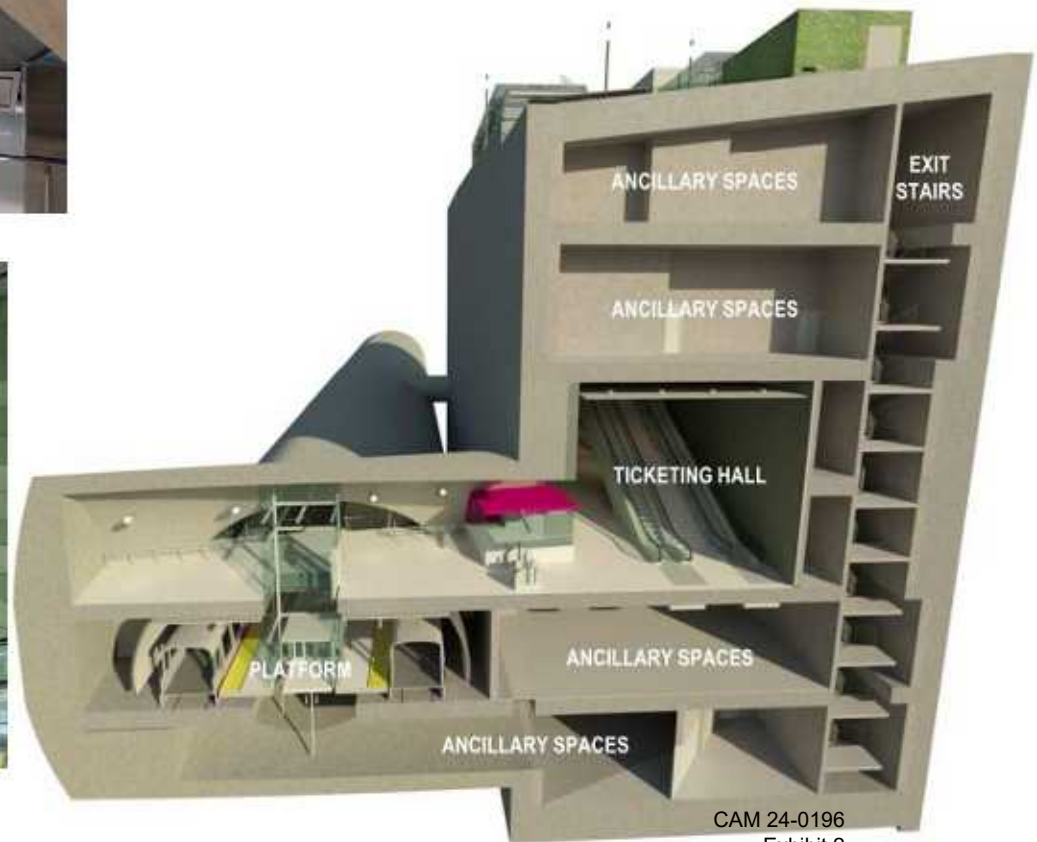
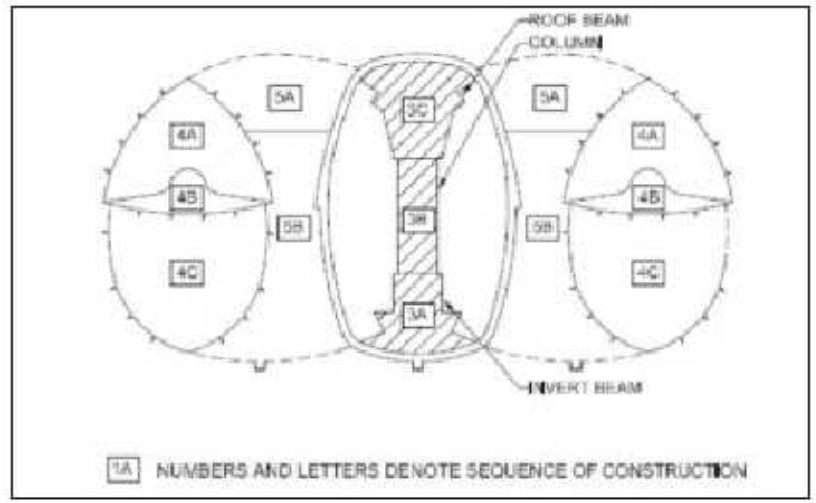
- Cavern Size 55’ wide x 43’ high
- Difficult ground condition
- Large cross-sectional areas
- Pre-excavated TBM Tunnels
- Confined setting with limited construction staging area
- Adjoining historical, sensitive structures, and extensive underground utilities



Examples of Triple Arch Stations

- **Fort Totten Station** - Section E5, Washington Metro
  - 65’ wide by 30’-7” high by 302 ft long
  - Platform is 28 ft wide
  - Limited cover of 20 ft
  - Unconsolidated sand and gravel with some clays
  - Multiple drifts station excavation
  - The center drift was the first to be excavated in 3’-0” rounds with top heading and bench
  - After column concrete reached required strength, the Inbound and Outbound drifts excavated sequentially
  - Pre-support measures and extensive instrumentation and monitoring program were implemented

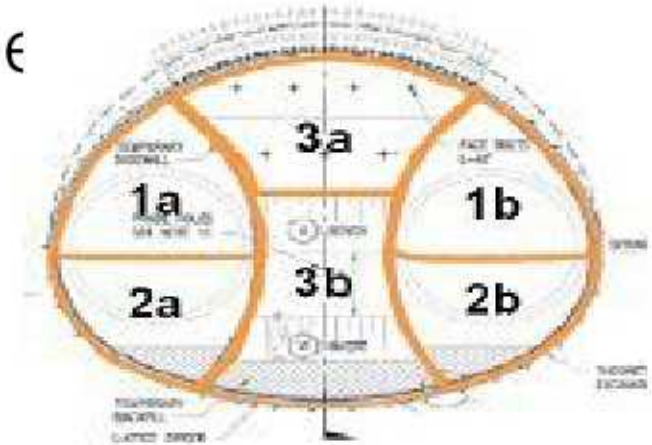
- **Wheaton and Forest Glen Stations** twin tube design is used with its platform in the tube; the inbound and outbound were connected by a wide corridor in the middle



Examples Station Construction Using SEM Me

Chinatown Station – San Francisco

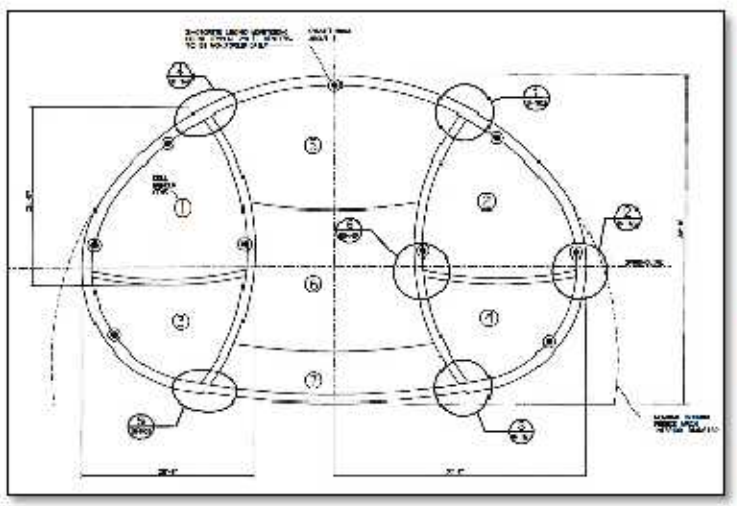
- Mixed ground conditions: Sandy Clays at the crown and weak and highly fractured rock
- 2060 sf excavation 55’-0” x 45’-8”
- Platform width 26”- 0”
- Cross Cut and Special Measures
- Pipe canopy, multiple headings and drifts
- Dewatering, compensation grouting, and heavy instrumentation
- Adjoining high rise residential/commercial Bldg. and landmark church

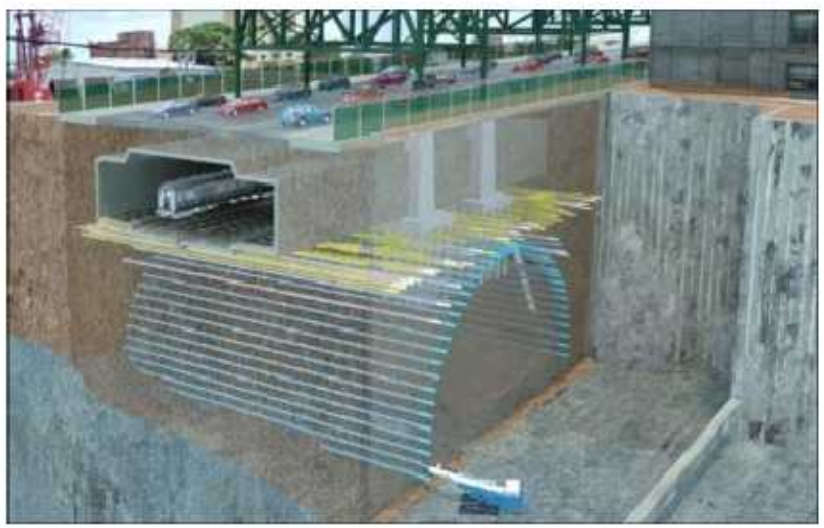


Platform Caverns SEM Sequence

Examples of Large Cross Section SEM Excavation

- **Northern Blvd Crossing, New York**
  - Glacial deposits sandy materials
  - Under Transit lines and major roadway
  - Limited cover
  - 1800 sf excavation area 60’-4” x 38’-9”
  - 120 ft length
  - Multiple drifts
  - Underpinning, ground freezing, Compensation grouting, and extensive instrumentation and monitoring

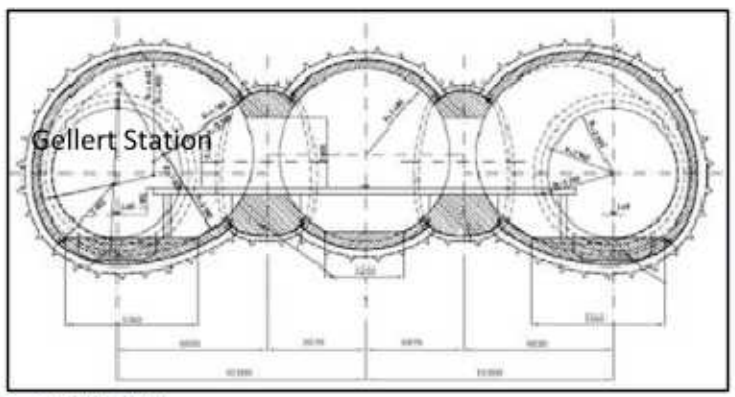




Examples of Triple Arch Station Caverns – Double Columns

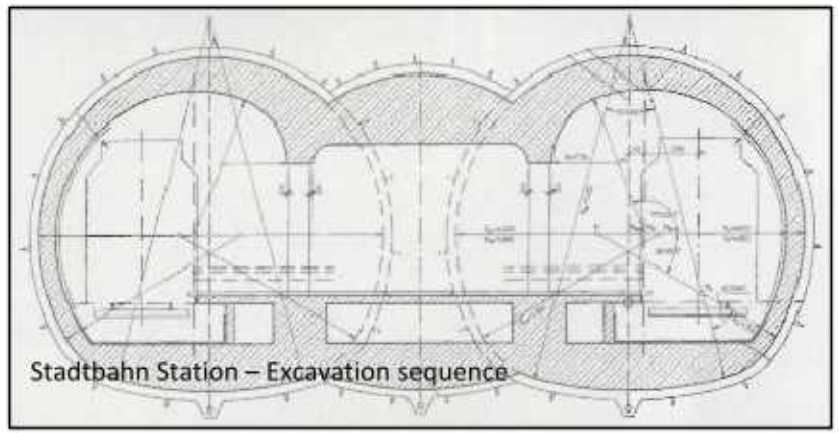
- **Prague Metro – Veleslavin Station**
  - Cavern width 65’-7” (20 m) in total
    Max. Vertical Height: 29’-6” (9 m)
  - Weathered Shales and mixed ground

- **Budapest Metro – Gellert Station**
  - 75’-5” (23 m) Wide, 29’-6” (9 m) high
  - Over-consolidated Clay
  - Multi-drifts and multiple headings



Examples of Triple Arch Station Caverns – Double Columns

- **Stadtbahn Station – Dortmund, Germany**
  - Width: 65’-7” (20 m); Height: 28’-10” (8.8 m)
  - Weathered shales and soft rock
  - Low cover 16 to 18 ft (6 to 7m)
  - Pre-support and prescribed sequential excavation


Stadtbahn Station – Excavation sequence


Stadtbahn Station


Stadtbahn Station – Pre-support

Exhibit B: Flood Gate Examples

Selected Examples of Implemented Flood Gates

Location: Boston, MA

Project goal: Reduce risk of damage from flooding on the Green Line; fewer weather-related service interruptions

Project description: This project entailed installation of steel doors at the Fenway Portal, located near Fenway Station, aiming to address the issue of flooding caused by the nearby Muddy River. In 1996, significant flooding resulted in extensive damage amounting to nearly $70 million and disrupted major sections of the Green Line for a period of 2 months. Since then, temporary flood prevention measures were implemented. However, the introduction of steel doors serving as flood gates, significantly enhance the safety and resilience of the project.

Flood gates enable a more prompt and efficient response in the event of a flood. By swiftly closing the doors, the potential damage caused by rising floodwaters can be minimized, thereby safeguarding the infrastructure and reducing repair costs.

Additionally, this approach facilitates a quicker resumption of service once the floodwaters recede, minimizing the disruption to operations.

Overall, enhancing safety and resiliency via proactive measures aims to mitigate the impact of potential flooding, protect the infrastructure, and enable a faster recovery and avoid costs arising from uncontrolled events.

Source: Fenway Portal Flood Protection Project | Projects | MBTA

Selected Examples of Implemented Flood Gates

Location: Miami, FL

Project goal: Enhance safety & resiliency and meet all requirements and local, state and federal standards.

Project description: Given the location and dealing with hurricane season annually, it is no surprise that Port of Miami's tunnel design included floodgates. The tunnel, equipped with four 55-ton hurricane flood gates is the first Florida project designed with resiliency in mind.

The flood gates protect the tunnel against flooding which mitigates risks related to sea level rise and climate change. It is estimated that 80% of the cargo traffic travelling in and out of the Port of Miami is using the tunnel, thereby avoiding the downtown areas and noticeably increasing quality of life for residents, while decreasing carbon emissions from congestion and idle time on city streets.

The flood gates can close and hermetically seal the structure within a few minutes in the event of a hurricane.

Source: ***Port of Miami, Meridiam and CBNA website***